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go and destroy as many villages, and catch as many people as he could for slaves. The Warua, especially, although holders of slaves, would rather die than be slaves themselves. I have heard instances of their being taken even as far as the Island of Zanzibar, and then making their way back, single-handed, to their own country. The only thing that will do away with slavery is opening up Africa to legitimate commerce, and this can be best done by utilizing the magnificent water-systems of the rivers of the interior.

MICROSCOPY.¹

WYTHE'S ILLUMINATOR. — Dr. J. H. Wythe recommends for oblique illumination a right-angled prism with a plano-convex lens, cemented to and covering one of its narrow sides, and an ordinary French triplet fastened to the other, close to the farthest angle. Arranged with the plano-convex lens directly downward, the axis of the triplet would be horizontal, and a horizontal cone of achromatic light would be furnished; while by slightly tilting the apparatus an available and extremely oblique illumination is obtained.

SAN FRANCISCO SOCIETY. — At the annual reception of this society, twenty-two members exhibited a large number of objects from the mineral, vegetable, and animal kingdoms. The intelligent classification of the views was a notable improvement upon the management of too many exhibitions of this kind.

BLIVEN'S PHOTOGRAPHS. — Mr. R. H. Bliven, of Elmore, Ohio, is now supplying good photographs of a large variety of objects. He also makes to order photographs of any suitable slide. Such pictures of familiar objects are very interesting. They are doubly important if the slides are particularly choice or rare, as a partial protection in case of accident to the objects themselves; while for educational purposes they are often available under circumstances where a resort to the microscope itself would cause too much interruption or delay.

APERTURE OF AN OBJECTIVE. — [Mr. Tolles contributes the following note in regard to the aperture of an objective marked 180° , which was sent to London some years ago, and has been the object of no little discussion ever since.]

The diameter of the exposed front surface of an immersion objective, is given as $.043''$, the point of focus as obtained by using only the rays emerging from the front, comparatively near to the axis, $= .013''$, and a diagram is given (Figure 25), as conclusive against any more than 118° of air-angle in the objective. But the objective was marked 180° of air-angle. A year afterwards the author of the diagram, Mr. Wenham, communicates

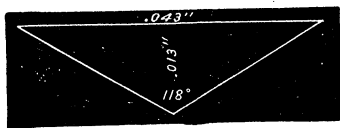


FIG. 25.

another item relating to the angular aperture of the same lens. He gives

¹ This department is conducted by DR. R. H. WARD, Troy, N. Y.

the greatest thickness of glass cover which it would work through as .018", and I will supply the triangle, (Figure 26) to suit the new distance in glass.

Measured by the outside lines, we have here a balsam angle of 100° . But the whole opening of the front face of an objective of quite moderate power, even, is seldom used. Accordingly, nearly a year of interval again having elapsed, he gives the utilized aperture of the front lens, front surface, as .033". The triangle thus becomes as the dotted lines make it in (Figure 27), which I contribute to the argument. It shows 180° inevitable for a dry mount, or as closely to that incidence = 90° of obliquity as can be practically considered, and the difference between 82° and 88° clearly an increase for balsam mounts over what a dry lens can have.

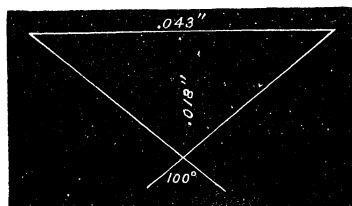


FIG. 26.

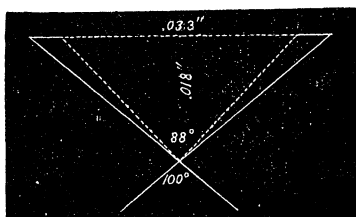


FIG. 27.

The fact is that the ray emerging into air at the extremest distance from the axis for the in-air utilized area, hugs the surface of the lens, traversing the air parallel to it. — R. B. TOLLES, Boston, May 5, 1876.

OXALATE OF ASPARAGINE. — Mr. C. C. Merriman's slides are prepared from saturated solutions of asparagine and oxalic acid, and solution of gum-arabic, about in the proportions of five, four, and three parts of each respectively. The solutions are mixed only in small quantities for immediate use, and the proportion varied according to the effect produced. When dry the specimens are protected by a thin film of collodion before mounting in old balsam.

ACTION OF POISON ON BLOOD. — Dr. Blake found that one grain of sulphate of thorium injected into the blood vessels of a rabbit caused death in two minutes, after which the blood-corpuscles, having entirely lost their natural form, presented an indented outline with numerous highly refracting dots at the circumference.

EXCHANGES. — [Notices not exceeding four lines in length, of microscopical objects, or apparatus wanted or offered in exchange, not sale, will be inserted in this column without expense.]

Seeds of *Paulownia imperialis*, in exchange for other good objects. — H. S. MOORE, Sixth Avenue, corner 43d Street, New York.

A large variety of objects, in exchange for any good slides. Lists furnished on application. — W. G. CORTHELL, 103 Warren Avenue, Boston, Mass.

Well mounted and named slides wanted in exchange for cabinet-size photographs of the objects. — R. H. BLIVEN, Elmore, Ohio.